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COMMONWEALTH PHYTOPATHOLOGICAL NEWS

A QUARTERLY REVIEW OF NEWS AND VIEWS ISSUED BY THE COMMONWEALTH MYCOLOGICAL INSTITUTE, KEW, SURREY

MAIN ITEMS

SPRAY TECHNIQUES
FROM NEAR AND FAR
BANANA DISEASES
PERSONAL NEWS
OVERSEAS NEWS
CONFERENCE NEWS

SPRAY TECHNIQUES: "LE BROUILLARD d'HUILE"

No reference has yet been made in the C.P. NEWS regarding the remarkable new spraying method evolved by the French in Guadeloupe for the control of banana leaf spot. This entails the use of mechanical knapsack mist-spraying machines, using a copper-in-oil fungicidal mixture, applied at the very low rate of $2\frac{1}{2}$ gallons per acre. On one banana estate in Jamaica eight men using five of these knapsack machines, with efficient refuelling arrangements, are adequately spraying 100 acres of bananas in a day. Incidentally some good control is now being obtained with orchard spray oil alone.

Potentialities

One of the most striking features of this method of control is the fungistatic effect of the oil after infection has occurred and the hyphae are developing in the mesophyll of the leaf during the relatively long incubation period of this disease. This fungistatic effect of the oil would seem to be only slightly enhanced by the addition of copper, in the form of copper oxychloride or cuprous oxide.

Although the orchard spray oil has been claimed to be phytotoxic to the living foliage of pears in the United States, coffee thrives under oil-sprayed bananas in Guadeloupe. The beneficial effect of this new oil spraying technique against banana leaf spot is so striking that one feels that it may prove a valuable means of controlling many other diseases, especially where a shortage of water precludes economic high-volume spraying. It might be well worth experimenting with this form of spraying in the control of any disease in which an eradicant fungicide is being sought, such as in the over-wintering stage of apple and pear scab or against the stem infections of coffee berry disease. I think I am right in believing that stem infections are a serious source of sporulation in the coffee berry disease in Kenya and a trial of this method of control might be worthwhile over there.

Remarkable Effects

We are thoroughly enjoying trials with this new oil spraying in our bananas and

it looks as if there may be big developments next year. We have a very full programme of research in all branches of our banana work here and it is all extremely interesting, for once a plantation has got into a state of bad control by this time of the year Bordeaux spraying is unable to hold back the disease. This is where the fungistatic effect of this oil spraying looks like being so remarkable, i. e. in being able to prevent much further increase of the disease from the day oil-spraying commences — so we hope!

Kingston, Jamaica. R. Leach

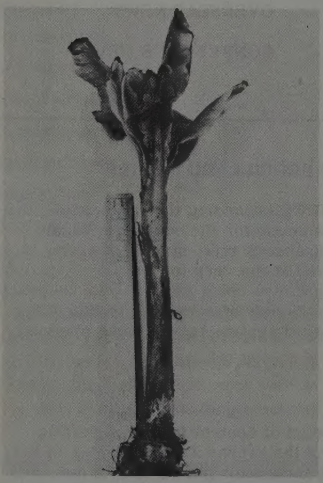
BANANA DISEASES IN WESTERN SAMOA

Bunchy Top Virus

by B. E. V. Parham, Director of Agriculture, Apia, Western Samoa

The occurrence of the virus disease bunchy top was not suspected in Western Samoa until late in 1955 and was not confirmed until April 1956, when the condition of plants in several plantations in the island of Upolu began to give cause for concern.

The external symptoms of the disease and the internal phloem necrosis in leaf blades and petioles were found to be typical. The vector, Pentalonia nigro-nervosa, determined by B. A. O'Connor, Senior Entomologist, Fiji, was present in numbers greater than normally seen by the writer in Fiji but generally less than in Australia. The insects were actively mobile and often seen feeding on the sap of petioles near the apex of the pseudostems. Although there was evidence of secondary infection of suckers, resulting in a wider distribution of the disease, its local occurrence in plantations was consistent with some primary infection by vector transmission.



Primary infection of banana sucker from Upolu district.

Resistance of Varieties

It has generally been considered that the banana variety grown commercially in Fiji (and in Western Samoa) is tolerant of, if not partially resistant to, this disease. Primary infection has not been considered an important factor in its spread in Fiji, where, however, careless selection of suckers from diseased stools frequently results in up to ten per cent. loss in new plantings.

This variety of banana probably belongs to the robusta group of the Cavendish clone and is known in Fiji as "vei mama" and in Western Samoa as "fa'i palagi". It is characterised by a taller habit, more open crown, and a more waxy cuticle in pseudostem and petioles than is the case in the more susceptible Chinese or Cavendish variety, known locally as "fa'i fuamaulalo". This latter variety has, on account of its susceptibility to this disease, almost disappeared from cultivation in both territories and is now grown commercially nowhere in the Pacific islands.

Campaign of Eradication

As soon as the diagnosis of the disease was confirmed, the Department of Agriculture organised an eradication campaign which is still in progress. For-

tunately, so far as field surveys indicate, the infected areas cover a limited sector in the Lefaga, Salamumu, and Safata districts of Upolu, on the south side of the island and involve the plantings of not more than 8 villages: a few isolated cases have been recorded from other districts also. The methods employed in the field involve the spraying of infected and adjacent stools with black-leaf 40, the only available insecticide, followed later by complete eradication of the former. The nature of the disease and the methods to be employed were explained to meetings of chiefs of the villages concerned, and the co-operation of growers is most satisfactory.

Unfortunately, other species and varieties of Musa, including the indigenous "fa'i taemanu" (Musa banksii var. samoensis) grow wild in many places. The related Heliconia bihai is also common, and the vector has been collected on various cultivated and wild aroids (Alocasia and Xanthosoma), so that it is not likely that the disease can be eradicated easily.

The importance of the banana industry is indicated by the exported figures for 1955 when 446,325 cases valued at £stg 1 each were shipped. In addition, the green fruit comprises the largest single item in the everyday diet of the people. It is estimated that the equivalent of 400,000 cases is so utilized annually. The fact that the advanced stages of bunchy top result in complete loss of fruit and in some cases in the destruction of the whole stool has convinced growers of the serious need to check its further spread.

VIRUS DISEASES OF FRUIT TREES IN EUROPE

Third Symposium at East Malling, July 1956

Members from eleven countries in Europe, and visitors from Israel, New Zealand, South Africa, and the United States spent five days at East Malling discussing virus diseases of fruit trees, excluding citrus and vines. Most of the time was spent in the experimental plots and nurseries, and in commercial orchards where the spread of diseases has been recorded for several years. One afternoon was devoted to lantern slides illustrating papers, which were summarised and discussed.

Value of Symposium

This type of symposium enables research workers to compare notes on techniques and work in progress, to agree (or agree to disagree) on nomenclature and descriptive terms used for symptoms. In this way, we hope to reduce the confusion that often arises through similar diseases being given different names in the literature, and different diseases being called by the same name.

East Malling is one of the few research stations where field trials are being carried out to estimate the effects of virus diseases on the growth and cropping of fruit trees. The relative importance of the widely distributed "mild" virus diseases is often debated but seldom investigated; the members of the symposium were obviously impressed by the effects of the diseases clearly demonstrated in replicated field trials.

Testing Propagating Material

One of the long-term problems the symposium hopes to solve is the prevention of further exchanges of virus diseases through the import and export of more or less symptomless plants. At present the health certificates given to horticultural material exported from most countries are based on clearly visible symptoms; only the use of clones suitably virus-tested can insure that this material is reasonably free from virus infection. As a first step in this direction, the members of

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the symposium agreed on a minimum range of indicator varieties to be used in testing for the virus diseases known to occur in fruit trees in Europe.

The unpredictable behaviour of viruses was well illustrated by two diseases. It was reported that plum pox in Jugoslavia renders the fruit unsuitable for making the national drink, plum brandy, and is regarded as a most serious disease. Infectious degeneration of the grape vine, on the contrary, markedly improves the quality of the wine in Switzerland, and the consequent reduction in crop causes little concern!

A. F. Posnette

THE FIRST EUROPEAN MYCOLOGICAL CONGRESS

About 150 delegates, representing 14 European countries and Israel, met in Brussels for this conference from 15 to 22 September, there being 15 mycologists from Great Britain; it was a little disappointing that all European countries were

Opening session of the First European Mycological Congress
In the chair: Mons. G. Malençon. Others on the platform (l. to r.): L. Imler (Antwerp), H. Haas (Germany), P. Heinemann (Belgium), J. Ramsbottom (Britain), P. Martens (Louvain), and R. Steyaert (Congo Belge).

not represented. Visiting members were mostly housed in four hotels in the centre of the city.

At the opening session in the beautiful Palais des Académies we were welcomed by Prof. P. Martens (University of Louvain), and the chairman, Mons. G. Malençon (Morocco), was elected. The Congress was primarily for field collecting and discussion and for this purpose five forays, covering a wide variety of terrain, were arranged. The areas visited were (1) the forests to the S.W. of Brussels, (2) the Campine heaths on the borders of Holland, (3) the calcareous Basse-Ardennes, (4) the littoral zones at Knocke and Coq, and (5) the forests of the Moyenne-Ardennes. There was no shortage of specimens, the season being exceptionally favourable for the larger fungi! It was fortunate, too, that the cold, wet weather preceding the congress gave way to a sunny, warm (or even hot), dry spell lasting throughout the week.

In addition to field meetings there were four paper-reading sessions, at which 13 communications were presented, four being on microfungi. At the Botanic Garden there was a comprehensive, well-arranged display of fungi and herbarium

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PLANT PROTECTION SECOND INTERNATIONAL CONFERENCE

Lively discussions and happy informality

Plant Protection Ltd.'s Second International Conference on Crop Protection was held at Fernhurst Research Station, near Haslemere, Surrey, from June 19th to June 21st, 1956. Plant Protection Ltd. is a commercial concern, associated with Imperial Chemical Industries Ltd., which is interested in the sales of pesticides. The Conference maintained a very high scientific level and a number of matters of great interest to plant pathologists were discussed. About 545 delegates

At the Demonstration plots. From left to right:- Sir John Russell, Mr. R. Hunter, Dr. Hudson and Prof. Suchorukov. At the back:- Prof. Engledow and Dr. E. Holmes.

attended from 42 countries, including such diverse entities as Dr. Rodriguez Jurado from the Ministry of Agriculture, Buenos Aires, and Professor K. T. Suchorukov from the Botanic Gardens, Moscow.

The Conference had a certain degree of originality in that it was sponsored by a commercial organisation rather than an official body and this gave the delegates a much freer area of discussion; in fact, the keynote of the Conference was the opportunity to discuss, for the papers had all been printed and circulated in advance. The author gave a summary of his main points and then two opening speakers commented on his paper before it was thrown open to the floor for discussion.

Education and International Co-operation

The opening paper by Dr. J. G. Knoll of the F. A. O., Rome, unfortunately had to be read due to his sudden illness. It dealt with the world-wide aspects of crop protection. The paper drew attention to the immense good that had been derived from international co-operation, which had started with the International

Phylloxera Convention of 1881, and pointed out how urgent was the need for better knowledge of the biology of plant pests and diseases, as could be seen by the frequently disastrous effects in a new environment of a relatively insignificant disease organism. For instance, South American maize rust, the cause of little trouble in its native environment, is particularly troublesome in Africa and is a threat to the Asiatic mainland. A good point made by Dr. Knoll is the need to educate the public to the dangers of plant diseases.

Host Resistance or Chemical Control?

An important session was devoted to the subject of genetics in relation to crop protection. The paper was written by Dr. W. F. Hanna of the Department of Agriculture, Ottawa, and the opening speakers were Professor Suchorukov (Moscow) and Dr. R. L. Knight (East Malling, formerly Sudan Government).

Since the pioneering work of Biffin fifty years ago considerable progress had been made in the production of wheat varieties resistant to rust, and similar progress with many other crops, but eventually the question arises as to which is the more economical, to continue this expensive work of breeding or to use chemical methods of control. For instance, the wheat stem rust, often reaching epidemic proportions in North America, has produced no less than 275 different races. It may take from seven to ten years for a new virulent race to become dominant and it takes about ten years to produce a variety of wheat resistant to it. On the other hand, discussing the bacterial blackarm disease of cotton, Dr. Knight said that varieties resistant to this disease give yields of 50 to 150 per cent. higher than comparable susceptible varieties.

During the discussion which followed, Mr. W. C. Moore (Harpenden) drew attention to a new strain of wart disease of potatoes reported from Germany, which seemed likely to be able to attack most of our present immune varieties and was consquently a serious threat to the crop.

Professor Suchorukov spoke (at some length) as a physiologist, maintaining that resistance is a function of genetic make-up and that it varies with environment and age, a proposition with which his hearers were obviously in complete agreement — a welcome international exchange. Professor Suchorukov indicated that a parasite reacts to changes in the development of the host plant but these changes may have been introduced by the parasite itself. Dr. A. E. A. McCallan (Boyce-Thompson Institute, U. S. A.) together with his two opening speakers, Dr. J. W. L. Beament (Cambridge) and Dr. J. T. Martin (Bristol) discussed the mechanism of toxicity. The interesting point was made that the effective chemical action of fungicides is determined by two factors: the degree of chemical toxicity and the degree of absorption by disease spores. Dr. P. W. Brian (Akers Laboratories, Welwyn) pointed out that systemic fungicides were still in their infancy and that they did not necessarily have to be antibiotics. For instance, sulphonamides had given control of rusts, but the difficulty was to find an effective dose which did not damage the plant.

Spraying and Dusting Demonstrations

A paper on the residual effects of pesticides was presented by Dr. J. M. Barnes (Medical Research Council, U. K.) and the general consensus of opinion at the meeting was that the greatest possible exchange of information between countries was most important in order to avoid dangers from toxic residues on crops.

The existence of effective chemicals for the control of diseases in crops is not of much use unless there are effective means of applying them to the crops. A most ineresting adress was given by Mr. R. P. Fraser (Imperial College, London) who showed a high-speed photography film of spray patterns made by different jets of spray fluids. This was followed in the afternoon by a demonstration of spray and dusting machinery. A particularly interesting one was the Kent Engineering Foundry's Electrostatic Dusting Machine in which the dust passes through a charged-electric field and thus spreads over and adheres to the crop in a far better manner than dust without the charge.

It was a happy thought to end the Conference with this demonstration. The delegates had an opportunity of realising that all this heavy scientific thinking had to be translated to practical conditions and the organisers still further drove home

the point by arranging, after the demonstration, a final buffet supper and cocktail party where ample opportunity was provided for an international exchange of ideas.

The proceedings of the Conference will be published by Butterworths early in the New Year.

G. O.

FROM NEAR AND FAR

Dr. W. J. Dowson's bacterial plant pathogen culture collection previously housed at Cambridge is now in the care of R. A. Lelliott at the Ministry's laboratory, Milton Road, Harpenden, Herts.

Progress made in the development of the National Vegetable Research Station, Wellesbourne, Warwickshire, is examplified by the holding of their first "open" day this year. The exhibits of the pathology section were of much interest.

The University College of Khartoum has now attained university status but will continue to appoint external examiners from the University of London and elsewhere, and English will be the official language, except in Arabic and Islamic law. There are seven faculties comprising about 870 students.

Publications of Interest

The documentation committee of the Society of Chemical Industry has issued a fourth list of amendments to the third edition of the "World List". Further enquiries to Miss M. I. Wyatt, The Laboratories, J. Lyons & Co., Ltd., 149, Hammersmith Road, London, W. 14.

A new journal dealing with the flora and horticulture of Australia under the title of Muelleria is being published by the Botanic Gardens and National Herbarium, Melbourne.

Webster's New World Dictionary has recently been published by Macmillan London at a price of £3-10s.

R. J. Richel, in collaboration with C. Maertens, has published a book of 450 pages on rubber diseases in the Belgian Congo (I. N. E. A. C. Sér. Tech. 400 fr.), dealing in large measure with practical problems, especially of control.

The Wilson Report on the organization of agricultural services and administration in Great Britain has recently been published by H. M. Stationery Office (Cmd. 9732, price 4s. 6d.) and will be found to be of considerable interest to all interested in this subject.

A valuable addition to the Index of Fungi has just been published by the C. M. I. This is a cumulative index of generic names and specific epithets in Petrak's Lists, 1920-1939. It comprises 168 pages of royal octavo and is priced at 20s., post free.

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specimens and of documents illustrating collections made in the Belgian Congo and elsewhere by members of the staff.

Non-mycological activities included conducted tours of Bruges (ancienne culture) and Antwerp (dock and the General Motors Factory), receptions by the burgomasters at the Hotels de Ville of Brussels and Antwerp, and a concluding banquet.

At the closing session it was announced that the committee elected to consider future meetings (British representative Mr. W. Graddon, President of the British Mycological Society) had accepted the suggestion that the second congress should be held if possible in Prague in either 1959 or 1960, or, failing Prague, in the British Isles.

Congratulations are due to Dr. P. Heinemann and his organising committee who made all the arrangements and ensured that the whole congress was profitable and enjoyable.

G. M. W.

PERSONAL NEWS

Director of C.M.I.

Dr. S.P. Wiltshire retired on the 30th September after 34 years service on the staff of C.M.I., during which he held the post of director and editor since 1940. He is succeeded by Dr. J.C.F. Hopkins, formerly Chief Botanist and Plant Pathologist, Southern Rhodesia and for the past two and a half years assistant editor, C.M.I.

Director of Royal Botanic Gardens, Kew

Sir Edward Salisbury retired on the 30th September and has been succeeded by Dr. G. Taylor, lately of the British Museum.

Visitors to C.M.I.

Among overseas visitors were: A. Shavitsky, P.G. Valder, Australia; S.M. Chen, China; F. Piening, Gold Coast; S.K. Bose, B.M. Gupta, T.S. Sundaram, India; H. Wheeler Harris, Irak; Frank O. Smith, Lebanon; C. Orieux, Mauritius; Sher Khan, A. Sattar, Pakistan; J. Pinto-Lopes, Portugal; John S. Boyce, Yale University, Louis K. Marm, California University, S.E.G. McCallan, Boyce Thompson Institute, W.H. Wheeler, Washington, U.S.A.

A number of overseas students were also entertained.

"Pool" News

It has been decided to publish reports on the investigations into broad bean wilt in Cyprus and Alternaria leaf spot of tobacco in Nyasaland as Phytopathological Papers of the Institute.

Appointments, Transfers, and Retirements

The Overseas Service of the Colonial Office announce the following appointments: E.J.H. Berwick, director of agriculture, North Borneo; J.H. Gisborne deputy director of agriculture (research), Northern Region, Nigeria; G.B. Kennard, deputy director of agriculture, British Guiana; C. North-Coombes, W.V. Rose, and H.J. Simpson, assistant directors of agriculture, Gold Coast, Western Region, Nigeria, and Malaya, respectively; W.R. Day, forest pathologist, Cyprus, and E.C. Hislop, mycologist to Colonial Pesticide Research Unit, Arusha, East Africa.

Dr. L.W. Poel has been appointed lecturer in botany at Birmingham University.

Prof. T. Wallace, Long Ashton, has been appointed a member of the reconstituted Agricultural Improvement Council, which reviews and advises the Government on agricultural research problems in Britain.

Dr. A.H. Moseman, formerly director of crops research U.S.D.A., has been appointed associate director for agriculture, Rockefeller Institute.

Awards

The Elvin Charles Stakman award of the University of Minnesota has been made to Emeritus Prof. W.L. Waterhouse, of the University of Sydney, for his work on the biology of cereal rusts.

Sir Henry Dale has been awarded the Albert Medal for 1956 of the Royal Society of Arts for his services to science.

OBITUARY

J. Nichol, officer in charge of the Ibadan sub-station of W.A.C.R.I., regrettably died of injuries received in the air crash at Kano in June.

OVERSEAS NEWS

NOTES FROM CANADA

Visiting Plant Pathologists

Dr. M.W. Cormack, Officer-in-Charge, Plant Pathology Laboratory, Science Service, Lethbridge, Alta. will be a member of the Canadian delegation to the Seventh International Grassland Congress to be held in Palmerston North, New Zealand, November 6 to 15, 1956. Besides participating in the programme on forage crop diseases at the congress Dr. Cormack will visit a number of research stations in Hawaii and New Zealand as well as participate in a tour in south-eastern Australia, organized by the Division of Plant Industry of Australia.

Dr. J.T. Slykhuis of the same laboratory, accompanied by his wife and family, left in April for a year in England on a transfer to the Rothamsted Experimental Station where he will continue his work on virus diseases of cereals. While abroad he will visit several plant disease research laboratories on the continent.

At the request of the Uruguayan government Dr. W.E. Sackston was granted a year's leave with pay to assist in the development of a research programme for the study and control of rust and other diseases of sunflower. Dr. Sackston, with his wife and family, left in July and will be located at "La Estanzuela" Experiment Station, Depto. Colonia, Uruguay.

New Quarterly Periodical

The Canada Department of Agriculture is the publisher of a new illustrated quarterly, RESEARCH FOR FARMERS, the first issue of 16 pages being dated 'Summer - 1956'. Its expressed purpose is "to help keep extension workers informed of developments in research and experimentation as carried on by the various units of the Department". Two of five leading articles in the first issue would interest plant pathologists: 'Rust resistant Selkirk wheat - result of 13 years' search' by R.F. Peterson, and 'Diagnosing mineral deficiencies in fruit trees' by H.R. McLarty and J.A. Stewart. Dr. McLarty, recently retired officer-in-charge of the Plant Pathology Laboratory at Summerland, B.C., is well known for his work on physiologic disorders of fruit trees.

I.L. Conners

AUSTRALIAN NOTES

The outbreak of cherry leaf spot (Coccomyces hiemalis) recorded in C.M.I. map No. 58 is considered to have been eradicated from New South Wales. It is now six years since eradicative measures were instituted and a search each year for the disease has failed to reveal any further sign of it.

New Records of Plant Diseases

During 1955-56 one hundred and two new records of plant diseases were made by the Biological Branch of the New South Wales Department of Agriculture. Although there appear to be one or two new invaders by far the majority of the pathogens have been with us many years and have been encouraged this year by seasonal conditions to display their presence. Due to the very wet weather at the beginning of 1956 root rots caused by species of Phytophthora were very prevalent. The host range of P. cinnamomi in New South Wales was extended by seventeen new records while P. cryptogea caused severe losses in tomato, potato, lucerne, and floricultural crops. Several new pasture diseases were recorded, some of the most important being clover rot (Sclerotinia sp.) on red, white, and crimson clovers, scorch (Kabatiella caulivora) on subterranean clover, and a number of leaf spots which might be important in future seasons.

Among other diseases recorded were white leaf spot (Cercosporella brassicae)

on brussels sprouts and wild turnip, leaf nematode (Aphelenchoides olesistus), causing severe damage to several types of ferns, and broad bean wilt (virus) which was recorded on eight new hosts. The leaf nematode was also recorded for the first time on Bergenia ligulata (saxifrage). A possible new invader was Centrospora acerina, which caused a severe leaf spot of pansy in nursery beds raised from imported seed. Preliminary eradicative measures were taken because of the wide host range of this pathogen.

Award for Research in Cereal Diseases

The first Award of the Elvin Charles Stakman Foundation of the University of Minnesota was made to Emeritus Professor W. L. Waterhouse, formerly Professor of Plant Pathology, University of Sydney.

C. J. Magee

NEW ZEALAND NOTES

R. A. Harrison, Entomologist at Plant Diseases Division, left for a visit to the United Kingdom. He will work at the Insecticide and Fungicide Section of Rothamsted Experimental Station for 6 months, and then two months at the British Museum.

D. W. Dye, Bacteriologist at Plant Diseases Division, left for post-graduate study at the University of Edinburgh. [Further New Zealand Notes on p. 62.]

Harvey C. Smith

FOREST PATHOLOGY NOTES FROM INDIA

Further observations on mortality and unsoundness in sal

This note is a supplement to the article in C.P. NEWS (Vol. 2, Pt. 3) and is based on a recent disease survey carried out in sal forests in the States of Orissa and West Bengal. In the former sal is dying on a large scale in Sambalpur, Deogarh and adjoining divisions. The trees begin to dry from the top downwards, in the same way as was observed in Uttar Pradesh and again there is no parasite on the stem or roots. The association of this condition with a lowered water-table needs to be substantiated from a study of water levels in wells at various places in the area during different times of the year. It is however striking that other tree associates of sal in the locality, for example, Terminalia tomentosa, Schliechera trijuga, Diospyros melanoxylon, are healthy.

Removal of Affected Trees

Although top-drying appears to be non-parasitic the periodic removal of affected trees is recommended. The dead trees yield sound timber since there is usually no wood-destroying fungi on them, but if such trees are allowed to remain in the forest the timber may be attacked by various pathogens, thus reducing the quality of timber. Diseased trees should also be marked for felling since they are destined to die soon and dead trees increase the risk of fire when inflammable dry bark or dead branches fall on the ground. As already stated in the previous note, fire predisposes sal to attack by gauj (Fomes caryophylli), which is present in the sal forests of Sambalpur. Thus periodic dry fellings to remove dead and dying sal trees should be carried out at about 2 to 3 year intervals, even at the risk of uneconomic exploitation, because such practice will safeguard the health of the future crop.

Susceptibility to F. caryophylli

Sal forests in the West and East Midnapur divisions in West Bengal till recently belonged mostly to zamindars (landlords) who worked them mainly for fuel on a

coppice system over a rotation of 10 years, leaving 10 to 15 standards per acre. Most of these standards and also plants which are allowed to grow into trees, for example, in avenues, are infected by F. caryophylli, the presence of which is marked by numerous punk knots or eyes on the stem (fig. 1). Due to continued coppicing for many decades the stumps and roots become thick and develop heartwood, which grows with increasing years, and guaj, which mainly attacks heartwood, lodges in the stumps. In 10 years the coppice shoots are free from the gauj fungus, but if allowed to grow heartwood develops in them and the fungus passes from the stump into the stem. The affected trees continue to grow since the sapwood is not attacked by the fungus, but the timber is lost for all practical purposes.

Fig. 1. Symptoms of Fomes caryophylli on sal standards left after coppicing.

Control

With the abolition of zamindari in Bengal the forests have become State-owned. There is now a likelihood of converting the present coppice forests into high forests for timber, for which sal is in great demand, for there are many species which can be raised for fuel, leaving sal to be grown for timber. The presence of the gauj fungus in an epidemic form in West and East Midnapur divisions, West Bengal, is, however, going to limit this development so that recruitment should be from seed and the land must be previously cleared of the infected coppice stumps to ensure a healthy stand.

Forest Research Institute,
Dehra Dun.

B.K. Bakshi

NOTES FROM AFRICA

Nyasaland Visit

During the recent investigation in Nyasaland of the leaf-spot of tobacco caused by Alternaria longipes, there was an opportunity of looking at other diseases and assessing their importance.

Tobacco Diseases

Alternaria leaf-spot (or brown spot) has probably been the most serious disease in the Protectorate, although it is to be hoped that improved cultural practices will markedly decrease its incidence. Frog-eye (Cercospora nicotianae) undoubtedly comes a close second. Although it is much less destructive in the field, it can lead to a considerable reduction in the market value of the cured leaf. Other tobacco diseases appear to be important only in certain districts. White mould, for example, (Erysiphe cichoracearum) is uncommon in Kasungu but has been some nuisance in the Namweras district.

Of the bacterial diseases, only angular leaf-spot (Pseudomonas angulata) has been of any account and the outbreaks have been sporadic.

Tobacco mosaic is decreasing in importance as more growers become aware of the connection between this disease and the smoking habits of their native labour! Some plants affected with leaf-curl can generally be found in most tobacco fields. On some farms, however, there have been rather more extensive outbreaks and general information on indigenous plants harbouring the virus seems to be lacking.

Comparison of Flue- and Fire-cured Diseases

One thing that is most striking is the little amount of disease that is to be found in the native-grown (fire-cured) tobacco compared with the European-grown flue-cured tobacco. Hollow stalk (E. aroideae) is one of the few diseases of importance and that is but rarely found in flue-cured tobacco. One wonders just how much this is related to differences in the tobacco varieties or to local selection, for most of the flue-cured tobacco seed has been recently imported from America, but fire-cured has been produced locally for many years.

Maize Rust

Away from tobacco, the arrival of Puccinia polysora on maize (C.P. NEWS, Vol. 1, Pt. 4, p. 62) has aroused considerable interest in the country and extensive experiments are being carried out at the Citedze Research Station, Lilongwe, on its effect on local varieties. A good many of these experiments were subjected to an unusual hazard this last season. A plague of army worms threatened to eat out of existence every young maize plant on the station! Prompt action by the station staff in applying suitable insecticides prevented this, however.

New Agricultural School for Africans

One notable event this year was the opening of the Colby School of Agriculture at Lilongwe. This school will provide agricultural courses for Africans and, initially, much of the teaching will be carried out by the staff of the Citedze Research Station. The buildings are situated in the grounds of the research station and contain not only classrooms and a lecture-hall but also a canteen and dormitories.

B. E. J. Wheeler

(Continued from p. 62)

It is a general condition with grasses and cereals that the younger foliage is higher in crude protein and lower in crude fibre and nitrogen-free extract than older foliage. It is unlikely to be a coincidence that the chemical pattern for rusted plants and less mature plants is similar. Though the hypothesis is simple, the chemistry involved in estimating the reduction in physiological age in relation to rust infection must be complex.

On the one hand, our interpretation of the results of the Henneberg analyses is that rust improves food value. On the other hand, farmers' opinion is that poor animal thrift accompanies rust. To reconcile these divergent views a better understanding of the effect of rust on palatability, daily food intake, vitamins and toxic substances, as well as rust spore allergy and the part played by climatic conditions is necessary.

The writer would appreciate the views of research workers who have information on this problem.

Crop Research Division,
Lincoln, New Zealand.

A. F. Greenall

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THINKING IN PRINT

WHAT IS THE EFFECT OF RUST ON CEREAL FORAGE CROPS?

Beneficial or deleterious to animals?

In our experiments with oats and ryecorn, leaf rust infection — severity 3 to 4, modified Cobb scale — has reduced forage yield by over 20 per cent., has decreased the content of crude fibre and nitrogen-free extract and has increased the crude protein and mineral content. In view of the close relationship of cereal leaf rusts and of wheat, oats, and ryecorn, this was to be expected from the numerous published results with wheat rust and from the few experiments with oat rust. Without reports of feeding trials of ruminants on rusted and unrusted forage the altered content of proximate constituents suggests higher digestibility and feed value of rusted forage.

Farmers' observations and the results of these experiments are in agreement that a yield reduction is caused by rust, but disagree on the effect of rust on food value. That animals grazing severely rusted pasture or cereal greenfeed do not thrive as well as and scour more than animals on unrusted pasture is the almost unanimous opinion of New Zealand stockmen, and it is difficult to reconcile these opinions of farmers on the nutritive value of rusted feed with the results of our experiments as stated above.

Resolution of this apparent contradication may come from further examination of several factors. Observation of both field experiments and farmers' crops suggests that rust reduces palatability. The resultant decrease in daily intake of green material might not be balanced by the combined effect of a higher dry matter percentage and higher nutritive value. Large fluctuations in consumption could cause scouring. However, no plausible reason for such a fluctuation is apparent. It has been suggested that a rust-induced toxin, undetectable by Henneberg analysis, could be responsible for digestive upsets and scouring, but a report of a recent experiment on the effect of rust on plant metabolism states that a substance toxic to plant tissue could not be detected: nor was there evidence that rust produced a substance of a short term toxic nature in an animal trial reported recently.

A further possibility is that environmental conditions favouring a rust epiphytotic may also be detrimental to animal thrift. Rust attack is frequently, but not necessarily, associated with wet conditions which are known to affect animals adversely. A still further possibility is that a percentage of animals are allergic to rust spores. In such an event only a relatively small number would be affected, and this agrees with some farmers' observations.

There appear to be three possible explanations for rust infection causing an alteration in chemical composition. The suggestion that rust fixes atmospheric nitrogen has been made by others, as in some experiments the nitrogen yield of rusted plants has exceeded that of rust-free plants, but in the present state of our knowledge this is an unlikely situation, which certainly has not occurred in our experiments, though the nitrogen percentage of the rusted plants has always been higher. This increased percentage of nitrogen in rusted plants can be simply explained. The soil, which is identical for both rusted and rust-free treatments, supplies equal amounts of nitrogen to each group of plants. This nitrogen is likely to be taken up equally by both treatments, but diluted less by the smaller production of materials consequent on lower photosynthetic activity and higher respiration rate of the rusted plants. Furthermore, though fixation of nitrogen — if it does in fact occur — could account for a higher nitrogen percentage and yield, it cannot by itself account for the altered proportion of crude fibre to nitrogen-free extract to minerals.

Changed composition could to some extent be explained by the proved effect of rust on the general physiology of the plant. Here again the increased nitrogen percentage could be the result of less dilution, but this does not explain satisfactorily the altered proportion of other constituents.

The last and most acceptable hypothesis for the altered composition is that rust reduces the physiologic age of the plant. The evidence for this, though not entirely clear cut, is strong and exceptions are probably explainable by dry conditions coupled with increased transpiration, causing a drought-induced earlier maturity.

(Continued on p. 60)

ASSOCIATION OF APPLIED BIOLOGISTS

Summer Meeting

The Summer Meeting of the Association of Applied Biologists which opened on 19th July was the first held outside Great Britain, when members travelled to Northern Ireland. The headquarters were in the Department of Mycology and Plant Pathology, The Queen's University, Belfast, and living accommodation was provided in the University. The Summer Conference of the Advisory Plant Pathologists of the N.A.A.S. had been held in the University during the previous two days and many advisers remained for the A.A.B. meeting.

Opening Day

The morning of the opening day was devoted to a paper-reading session. The members having been welcomed by Professor A.E. Muskett, papers describing research work carried out in the Department of Mycology and Plant Pathology were read by Drs. J. Colhoun, D.A. Doling, and P.H. Lowings, while Professor J. Heslop Harrison described work which he is carrying out in the Department of Botany. During the afternoon members inspected the recently established Plant Pathology Field Station on the outskirts of Belfast and discussed the work in progress. This work relates chiefly to the study of diseases of the potato, flax, and horticultural crops, with considerable emphasis being placed on virus diseases. Members with interests in entomology also visited the laboratories of the University Department of Agricultural Zoology and the Entomology Division of the Ministry of Agriculture. In the evening the University entertained members of the Association at an informal reception.

Excursions

The following two days were devoted to field excursions. The first day was devoted to the potato crop and opportunities were afforded to members of observing the high standards of health maintained in crops being grown for the production of "seed". Attention was also directed to the methods employed in carrying out inspections of growing crops and tubers so that these high standards of health are not permitted to deteriorate. Visits were paid during the day to trials being carried out by the Ministry of Agriculture and to the farm of Mr. John Clarke, the well-known potato breeder, where members were able to inspect a wide range of new seedlings and to see the methods employed in his work. The Minister of Agriculture entertained the members at lunch in the Causeway Hotel on the north coast of county Antrim and made a short speech of welcome. After lunch, on a hurried visit being paid to the Giant's Causeway, some members were heard to express disagreement with Dr. Johnson's opinion that "it was worth seeing but not worth going to see". The return journey from Ballycastle to Belfast was made via the coast road, which was built as a relief measure during the Irish potato famine in the mid-nineteenth century.

Plant Breeding

The final day of the meeting was spent mainly at the grounds of the Plant Breeding Division of the Ministry of Agriculture at Loughgall, Co. Armagh, where the work in progress on the oat, flax, and ryegrass crops was discussed. The return journey from Loughgall was made through the Mourne Mountains.

J.C.

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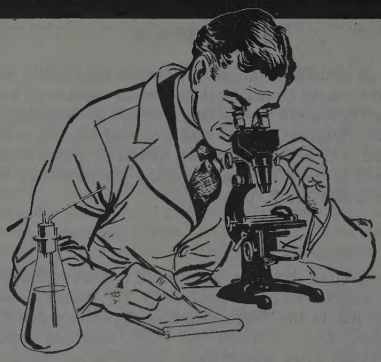

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